APLpy: Who took the last slice?
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[1] The APLpy (Astronomical Plotting Library in Python) package is a Python library for making FITS files into publication-quality plots quickly and efficiently. It can output files as EPS, PDF, PS, PNG, and SVG.

[2] I selected this package because I wanted to explore packages that were useful for astronomy plotting since I am majoring in physics and astronomy.

[3] APLpy was created in 2009. It does not have a direct parent code, but it builds off of the python and astropy ecosystem used for astronomical computation. It takes from both Matplotib and Astropy's WCSAxes to make plots of astronomical images. The WCSAxes package in Astropy can be used to make plots of astronomical images in a similar sort of way. WCSAxes can be used for making more complex plots or if someone wants an interface that's similar to Matplotlib. However for quick, easy plotting, APLpy is useful.

[4] It is still being maintained by one of the original authors,Thomas Robitaille, and a number of new contributors. The latest version 2.2.0 was released on November 14, 2024. There are instructions on how to contribute to the project on the APLpy github.

[5] APLpy was easy to install using the "pip install aplpy" command in the Jupyter Notebook interface.

[6] It installs via the "standard" pip.

[7] The source code is available on github (https://github.com/aplpy/aplpy).

[8] The code is not used by other packages.

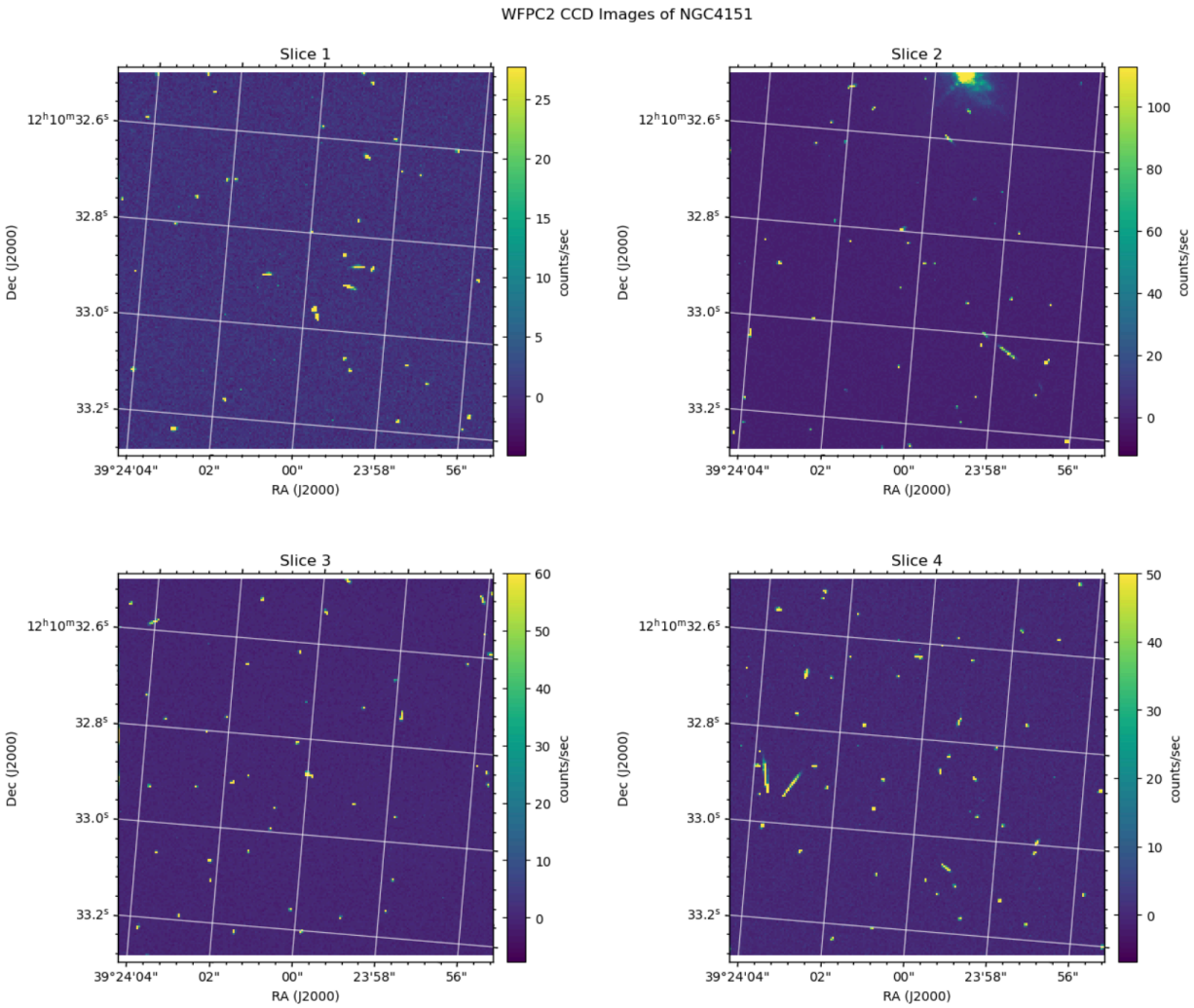
[9] The code is used via a jupyter notebook. The code can also be used in the terminal via a non-interactive mode.

[10] The accompanying notebook shows multiple ways that APLpy can be used to create figures with different FITS files.

[11] The APLpy package produces figures from FITS files, but Matplotlib is used behind the scenes. APLpy uses Astropy's WCSAxes to draw coordinate axes and grids, and that uses

Matplotlib to do rendering. Previous versions of APLpy (before APLpy 2.0) drew coordinate axes and grids directly without WCSAxes.

[12] Here is a figure showing 4 different CCD images of the NGC4151 galaxy, which is a spiral Seyfert 1 Galaxy. The CCD images were taken using Hubble's WFPC2.



[13] The APLpy package is pure python.

[14] The input to the APLpy package is FITS files.

[15] The output of the package is plots, and it can make output files as EPS, PDF, PS, PNG, and SVG.

[16] ALPpy has unit tests and regression tests. Regression tests can be run with "python setup.py test". It does not have benchmarking tests.

[17] I can be confident that the code produces reliable results because it has unit tests and regression tests, so I'm confident that the functions are doing what they are supposed to be doing.

[18] APLpy depends on Matplotlib and Astropy's WCSAxes for plotting. This information can be found in the APLpy documentation.

[19] APLpy provides documentation on their website (https://aplpy.readthedocs.io/en/stable/). It was sufficient for me.

[20] APLpy preferred citation (https://aplpy.github.io/):
"This research made use of APLpy, an open-source plotting package for Python (Robitaille and Bressert, 2012; Robitaille, 2019)"

[21] References:

- Documentation: https://aplpy.readthedocs.io/en/stable/
- Github: https://github.com/aplpy/aplpy
- Website: https://aplpy.github.io/
- Regression/Unit tests: https://github.com/aplpy/aplpy/blob/main/CHANGES.md

[22] Using ADS, two papers out of 716 citations were:

- https://www.researchgate.net/publication/388657704_SIGNALS_on_the_mixing_of_oxygen_and_nitrogen_in_the_spiral_galaxy_NGC_6946
- https://www.researchgate.net/publication/390749559_Weak_lensing_analysis_of_A115_A2219_and_A2261_Detection_of_galaxy_groups_and_filaments_around_clusters.

[23] I did not have to learn new python methods to use this package – the class was good enough to get me through this project.

[24] I did not have prior experience with using this package or data – this was all new to me. I collaborated in a group with Erika Falco and Isaac Sherwood.